JC05 Rec'd PCT/PTO 2 4 SEP 2001

FORM PTO-1390 (REV. 10-95) U.S. DEPARTMENT OF COMMERCE PATENT AND TRADEMARK OFFICE

TRANSMITTAL LETTER TO THE UNITED STATES DESIGNATED/ELECTED OFFICE (DO/EO/US) CONCERNING A FILING UNDER 35 U.S.C. 371

ATTORNEY'S DOCKET NUMBER: CM2094

U.S. APPLICATION NO. (if known, see 37 CFR 1.5): 09/937263

INTERNATIONAL APPLICATION NO.	INTERNATIONAL FILING DATE	PRIORITY DATE CLAIMED
PCT/US00/11304	27 April 2000	28 April 1999

TITLE OF INVENTION: Storage System

APPLICANT(S) FOR DO/EO/US: ASHTON, Kevin John

Applicant herewith submits to the United States Designated/Elected Office (DO/EO/US) the following items and other information.

1. [x] This is a FIRST submission of items concerning a filing under 35 U.S.C. 371.
2. [] This is a SECOND or SUBSEQUENT submission of items concerning a filing under 35 U.S.C. 371.
3. [] This express request to begin national examination procedures (35 U.S.C. 371(f) at any time rather than delay examination until the expiration of the applicable time limit set in 35 U.S.C. 371(b) and PCT Articles 22 and 39(l).
4. [x] A proper Demand for International Preliminary Examination was made by the 19th month from the earliest claimed priority date.
5. [x] A copy of the International Application was filed (35 U.S.C. 371(c)(2))
   a. [] is transmitted herewith (required only if not transmitted by the International Bureau).
   b. [] has been transmitted by the International Bureau.
   c. [x] is not required, as the application was filed in the United States Receiving Office (RO/US).
6. [] A translation of the International Application into English (35 U.S.C. 371(c)(2)).
7. [x] Amendments to the claims of the International Application under PCT Article 19 (35 U.S.C. 371(c)(3))
   a. [] are transmitted herewith (required only if not transmitted by the International Bureau).
   b. [] have been transmitted by the International Bureau.
   c. [] have not been made; however, the time limit for making such amendments has NOT expired.
   d. [x] have not been made and will not be made.
8. [] A translation of the amendments to the claims under PCT Article 19 (35 U.S.C. 371(c)(3)).
9. [x] An oath or declaration of the inventor(s) (35 U.S.C. 371(c)(4)).
10. [] A translation of the annexes to the International Preliminary Examination Report under PCT Article 36 (35 U.S.C. 371(c)(5)).

Items 11. to 16. below concern document(s) or information included:

11. [] An Information Disclosure Statement under 37 CFR 1.97 and 1.98.
12. [] An assignment document for recording. A separate cover sheet in compliance with 37 CFR 3.28 and 3.31 is included.
13. [x] A FIRST preliminary amendment.
    [] A SECOND or SUBSEQUENT preliminary amendment.
14. [] A substitute specification.
15. [x] A change of power of attorney and/or address letter.
16. [] Other items or information:

"Express Mail" mailing label number EL483621006US

Date of Deposit 24 Sep 2001

I hereby certify that this paper/fee is being deposited with the United States Postal Service "Express Mail Post Office to Addressee" service under 37 CFR 1.10 on the date indicated above and is addressed to The Assistant Commissioner of Patents, Washington, D.C. 20231

Administrator Mailing Application

Signature Virginia C Byrd

JC16 Rec'd PCT/PTO SEP 2 4 2001

U.S. APPLICATION NO. (If known, see 37 CFR 1.5)	INTERNATIONAL APPLICATION NO.	ATTORNEY'S DOCKET NUMBER
09/937263	PCT/US00/11304	CM2094

	CALCULATIONS	PTO USE ONLY
ENTER APPROPRIATE BASIC FEE AMOUNT =	$710	
Surcharge of $130.00 for furnishing the oath or declaration later than [ ] 20 [ ] 30 months from the earliest claimed priority date (37 CFR 1.492(e)).	$0	

CLAIMS	NUMBER FILED	NUMBER EXTRA	RATE		
Total Claims	11-20 =	0	x $18.00	$0	
Independent Claims	1-3 =	0	x $80.00	$0	
MULTIPLE DEPENDENT CLAIM(S) (if applicable)			$270.00	$0	
TOTAL OF ABOVE CALCULATIONS =				$710	
Processing fee of $130.00 for furnishing the English translation later than [ ] 20 [ ] 30 months from the earliest claimed priority date (37 CFR 1.492(f)).				$0	
TOTAL NATIONAL FEE =				$710	
Fee for recording the enclosed assignment (37 CFR 1.21(h)). The assignment must be accompanied by an appropriate cover sheet (37 CFR 3.28,3.31). $40.00 per property +				$0	
TOTAL FEES ENCLOSED =				$710	
				Amount to be refunded	$
				charged	$

a. [ ] A check in the amount of $ ____ to cover the above fees is enclosed.

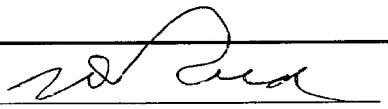
b. [x] Please charge my Deposit Account No. 16-2480 in the amount of $ 710 to cover the above fees. A duplicate copy of this sheet is enclosed.

c. [x] The Commissioner is hereby authorized to charge any additional fees which may be required, or credit any overpayment to Deposit Account No. 16-2480 . A duplicate copy of this sheet is enclosed.

NOTE: Where an appropriate time limit under 37 CFR 1.494 or 1.495 has not been met, a petition to revive (37 CFR 1.137(a) or (b)) must be filed and granted to restore the application to pending status.

SEND ALL CORRESPONDENCE TO:

M. P. Fitzpatrick, Patent Attorney
Customer Number 27752



Signature

T. David Reed
Name

32,931
Registration Number

JC16 Rec'd PCT/PTO SEP 2 4 2001
09/937263

CM2094

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In the Matter of:
In the U.S. National Phase Entry
Under 35 USC 371 from
International Application of
ASHTON, Kevin John
Int'l. Application No. PCT/US00/11304
Filed in the RO/US on 27 April 2000
Entitled: *Storage System*

PRELIMINARY AMENDMENT UNDER 37 CFR § 1.112

Assistant Commissioner for Patents
Washington, D.C. 20231
Dear Sir:

Prior to Examination and computation of the fees for entering the captioned International Application into the U.S. National Phase, please preliminarily amend the above-identified application as follows and consider the following Remarks.

AMENDMENTS

IN THE CLAIMS:

4. A storage system according to Claim 3, wherein one or more of the supports includes an electronic character display.

5. A storage system according to Claim 1, wherein the supports comprise shelves.

6. An inventory control system including a storage system according to Claim 5, and a data processing unit arranged to receive information the sensor or sensors.

8. An inventory control system according to claim 7, including software to analyse the level of stock of items on individual shelves and provide a signal indicative of the requirement for replenishment of the items when the number of items falls below a pre-determined threshold level.

9. A system according to Claim 8, when dependent on claim 5, including means for passing information to a shelf display so as to display the prices of shelved items and/or other information, enabling price changes to be indicated substantially instantaneously when changes are made in the data processing unit.

10. A system according to Claim 9, including means for checking the location and/or quantity of items at a given shelf location and providing an indication of misplaced items.

11. A system according to Claim 10, including means for providing an indication of the removal of large numbers of items usually sold singly or in small numbers from a shelf location.

REMARKS

Claims 1, 2, 3, and 7 remain in this application. Claims 4, 5, 6, 8, 9, 10, and 11 have been amended by eliminating multiple dependent claims. Attached hereto is a marked-up version of the changes made to the claims by the current amendment. The attached page is captioned "Version With Markings to Show Changes Made".

The support for these amendments is found in the claims as originally filed. These amendments are being entered to bring the claims into conformance with, *inter alia*, 37 CFR §1.75; no new matter is added.

Respectfully submitted,

By

T. David Reed
Agent for Applicants
Registration No. 32,931

24 September 2001
5299 Spring Grove Avenue
Cincinnati, Ohio 45217-1087
Phone: (513) 627-7025
FAX: (513) 627-6333

VERSION WITH MARKINGS TO SHOW CHANGES MADE

In the claims:

CLAIMS

1. A storage system comprising one or more supports and, associated with the supports, one or more sensors arranged to detect the presence of transponders associated with items to be stored on the supports, to read information from the transponders, and to transmit information read from the transponders to, for example, a data processing unit.

2. A storage system according to claim 1, wherein at least one sensor is arranged to receive signals from a transponder comprising an RFID tag.

3. A storage system according to claim 1, wherein at least one sensor is arranged to receive signals from a transponder comprising a multi-bit magnetic tag.

4. A storage system according to [any] CLAIM of claims 1 to 3, wherein one or more of the supports includes an electronic character display.

5. A storage system according to [any] CLAIM 1 of the preceding claims, wherein the supports comprise shelves.

6. An inventory control system including a storage system according to [any] CLAIM of claims 1 to 5, and a data processing unit arranged to receive information the sensor or sensors.

7. An inventory control system according to claim 6, wherein the data processing unit is a computer system programmed to maintain a database of information about individual items held on the supports for stock control purposes and the like.

8. An inventory control system according to [claim 6 or claim 7], including software to analyse the level of stock of items on individual shelves and provide a signal indicative of the requirement for replenishment of the items when the number of items falls below a pre-determined threshold level.

9. A system according to [any] CLAIM of claims 6 to 8, when dependent on claim 5,

including means for passing information to a shelf display so as to display the prices of shelved items and/or other information, enabling price changes to be indicated substantially instantaneously when changes are made in the data processing unit.

10. A system according to [any of CLAIM claims 6 to] 9, including means for checking the location and/or quantity of items at a given shelf location and providing an indication of misplaced items.

11. A system according to [any of CLAIM claims 6 to] 10, including means for providing an indication of the removal of large numbers of items usually sold singly or in small numbers from a shelf location.

STORAGE SYSTEM

The present invention relates to storage systems and, more particularly, to storage systems of the type used to display items in a supermarket or the like. The term 'storage' is thus used in the context of the present application to mean a system on or in which items may be held temporarily or semi-permanently until moved therefrom, such as display shelving systems in retail outlets and the like, warehouse shelving, etc.

A number of difficulties exist in factories, wholesale outlets, and retail outlets such as supermarkets, in maintaining a stock of items and displaying items for sale to shoppers, etc. In particular in a retail outlet, it is necessary for the stocking of items on the shelves and similar supports to be monitored and, conventionally, this involves personnel carrying out a visual check and/or count in order to ensure that items are always available for purchase. However, this is obviously both time-consuming, prone to error, and expensive in staff costs. Additionally, changes in the pricing of items have to be indicated on the shelf and this again requires staff intervention. In both of these processes, monitoring and price adjustment, mistakes by staff can cause considerable annoyance and additional work.

The present invention is aimed at applying a system which can be used to overcome these problems as well as create additional advantages.

According to the present invention there is provided a storage system comprising one or more supports and, associated with the supports, one or more sensors arranged to detect the presence of transponders associated with items to be stored on the supports, to read information from the transponders, and to transmit information read from the transponders to, for example, a data processing unit.

The storage system may be a shelving system, for example, a display system as used in retail outlets or the like, or in warehouses etc.

An inventory control system may include a storage system as defined above, together with a data processing unit arranged to receive information the sensor or sensors.

The data processing unit is preferably a computer system programmed to maintain a database of information about individual items for stock control purposes and the like.

In particular, the transponders may comprise RFID or multi-bit magnetic tags which may be attached to or otherwise integrally associated with items to be stored and

displayed on the shelves.

By using such a system it is possible to detect or infer the presence, absence and removal of items from a support, eg. a shelf, either in real time or close to real time via continuous or continual intermittent polling.

The system may be used in a number of ways to manage logistics and inventory of items, for example, to analyse the level of stock of items on individual supports such as shelves and, via a computer system, trigger replenishment when the number of items falls below a pre-determined threshold level. The supports may be provided with electronic displays so as to display the prices of items and other information if desired, enabling price changes to be indicated substantially instantaneously. The location and quantity of items can also be checked for compliance with agreed plans and designs and misplaced items may also be readily located by means of such a system.

Accurate data about the off-take of items, for example, how many times an item is picked up and replaced before purchase, the effects of changes in store environment, e.g. signage, position, etc., and the identification of unusual shelf activity, e.g. the removal of large volumes of generally slow-moving items, may all be provided by such a system.

A number of examples of systems according to the present invention will now be described with reference to the accompanying drawings in which Figs. 1 to 5 each provide a diagrammatic cross-sectional view of a storage system in the form of a shelving system intended for reading radio frequency ID tags (RFID tags) which may be attached to or embedded in the packaging of individual items displayed for sale.

Fig. 1 illustrates a basic example in which a shelf 1 is supported from a wall panel or the like 2 along its rear edge, the shelf carrying, along its length, one or more antennas 3 which are shielded by appropriate shielding 4 from the shelf below and which, in effect, provide an antenna field 5 for the location and reading of information on RFID tags 6 attached to or embedded within items 7 disposed on the shelf 1. The RFID tags (which are conventional) each consist of an integrated circuit attached to a radio antenna affixed to substrate, and the shelf can send and receive digital data to the receiving antennae of the tags via radio signals at frequencies of the electro-magnetic spectrum including 125khz, 13.56mhz and 2.45ghz.

The or each antenna 3 is connected via a suitable cable 8 or else via wireless transmission to a computerized inventory control system which maintains a database which is updated by information supplied from the RFID tags 6 via the antennas 3.

Fig. 2 illustrates a modified design in which items 7 are intended to be slung beneath a shelf 1 which includes a hook or similar device to hold the items. Again, appropriate shielding can be provided for the antenna 3.

More complex designs may be necessary where items are intended for stacking one on top of another, because individual items may act as shields for the tag reading system by attenuating the radiation, so as to cause some tags to be unread. A more complex design is shown in Fig. 3 in which a pair of antennas are provided, one on the underside of an upper shelf 1 and another on the top of a lower shelf 1'.

Still more complex designs, such as that shown in Fig. 4 may be provided where multiple items may be stacked on top of one another, in this case, a further antenna 3 being disposed adjacent to the wall panel 2 or the like. Each of the antennas shown in Fig. 4 is disposed to detect a different set of tags depending upon the range and interference from the items themselves. Depending upon the information supplied by each tag, the computer system to which the antennas are attached will be able to identify or at least infer the number of products on the shelf.

An alternative approach indicated in Fig. 5, is the use of shelf antennas that can detect at different frequencies or different field sizes indicated by the different antenna fields 5, 5'. The system may be used in combination with a further antenna 3 located, for example, as shown, in an opposing shelf.

It will be readily apparent that a very wide number of possible configurations is available, depending upon the type of tags used, the items intended to be displayed, etc., and the present invention is not limited to any particular combination.

A system of this type is capable of providing monitoring and tracking of items in real time or close to real time with a high degree of accuracy and precision without the need for manual intervention. This overcomes the currently labour-intensive shelf checking systems presently used and enables a number of problems to be overcome such as misplacement of items, failure to replenish removed of items with sufficient speed, non-detection of shelf "sweeping" by thieves, failure to reorder stolen or shrunken stock and the need to conduct laborious stock checks on a regular basis.

Additionally, the tags may be read by appropriate checkout systems also connected to the computerized inventory system, providing additional information and verification.

CLAIMS

1. A storage system comprising one or more supports and, associated with the supports, one or more sensors arranged to detect the presence of transponders associated with items to be stored on the supports, to read information from the transponders, and to transmit information read from the transponders to, for example, a data processing unit.

2. A storage system according to claim 1, wherein at least one sensor is arranged to receive signals from a transponder comprising an RFID tag.

3. A storage system according to claim 1, wherein at least one sensor is arranged to receive signals from a transponder comprising a multi-bit magnetic tag.

4. A storage system according to any of claims 1 to 3, wherein one or more of the supports includes an electronic character display.

5. A storage system according to any of the preceding claims, wherein the supports comprise shelves.

6. An inventory control system including a storage system according to any of claims 1 to 5, and a data processing unit arranged to receive information the sensor or sensors.

7. An inventory control system according to claim 6, wherein the data processing unit is a computer system programmed to maintain a database of information about individual items held on the supports for stock control purposes and the like.

8. An inventory control system according to claim 6 or claim 7, including software to analyse the level of stock of items on individual shelves and provide a signal indicative of the requirement for replenishment of the items when the number of items falls below a pre-determined threshold level.

9. A system according to any of claims 6 to 8, when dependent on claim 5,

including means for passing information to a shelf display so as to display the prices of shelved items and/or other information, enabling price changes to be indicated substantially instantaneously when changes are made in the data processing unit.

10. A system according to any of claims 6 to 9, including means for checking the location and/or quantity of items at a given shelf location and providing an indication of misplaced items.

11. A system according to any of claims 6 to 10, including means for providing an indication of the removal of large numbers of items usually sold singly or in small numbers from a shelf location.

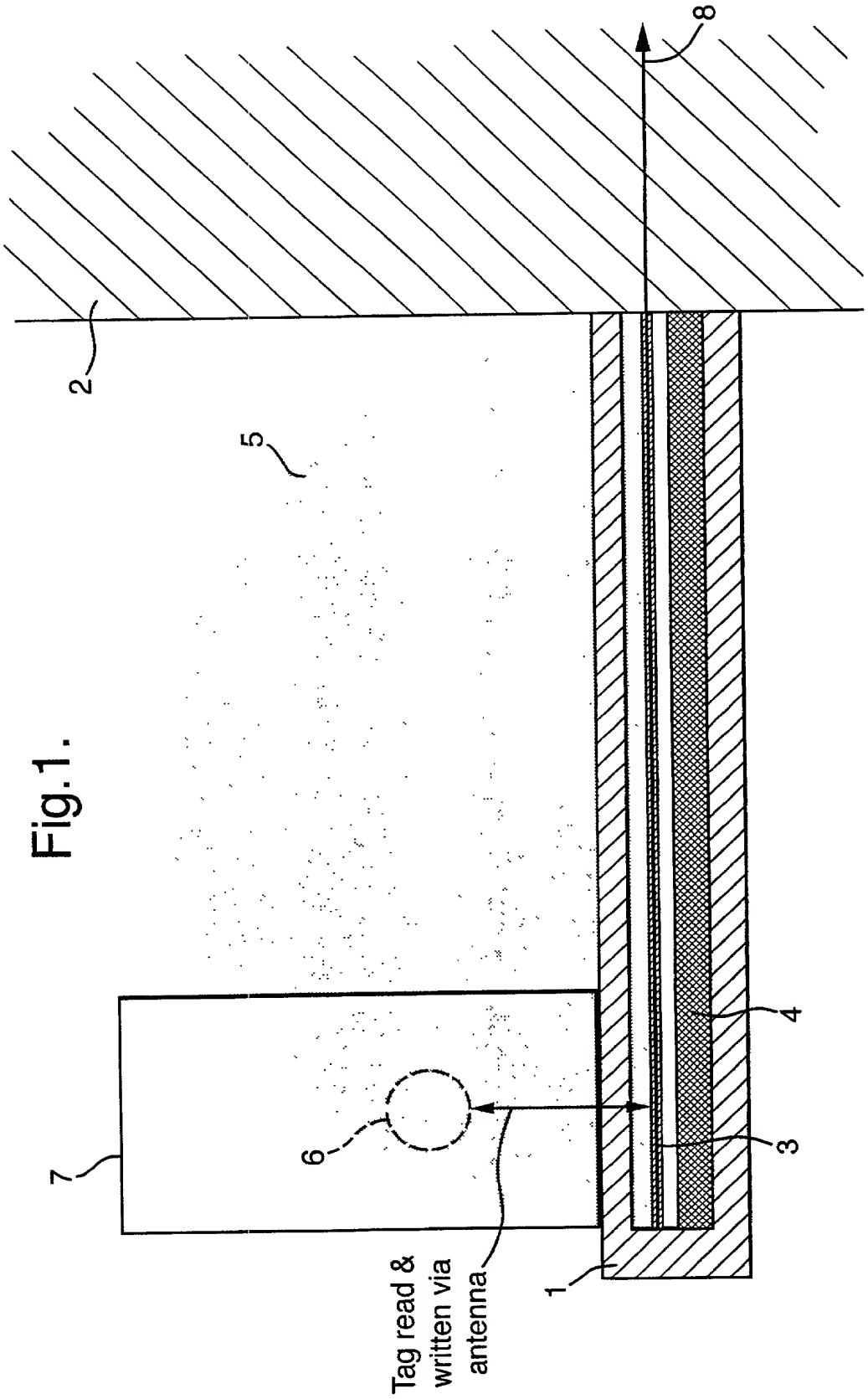


Fig.1.

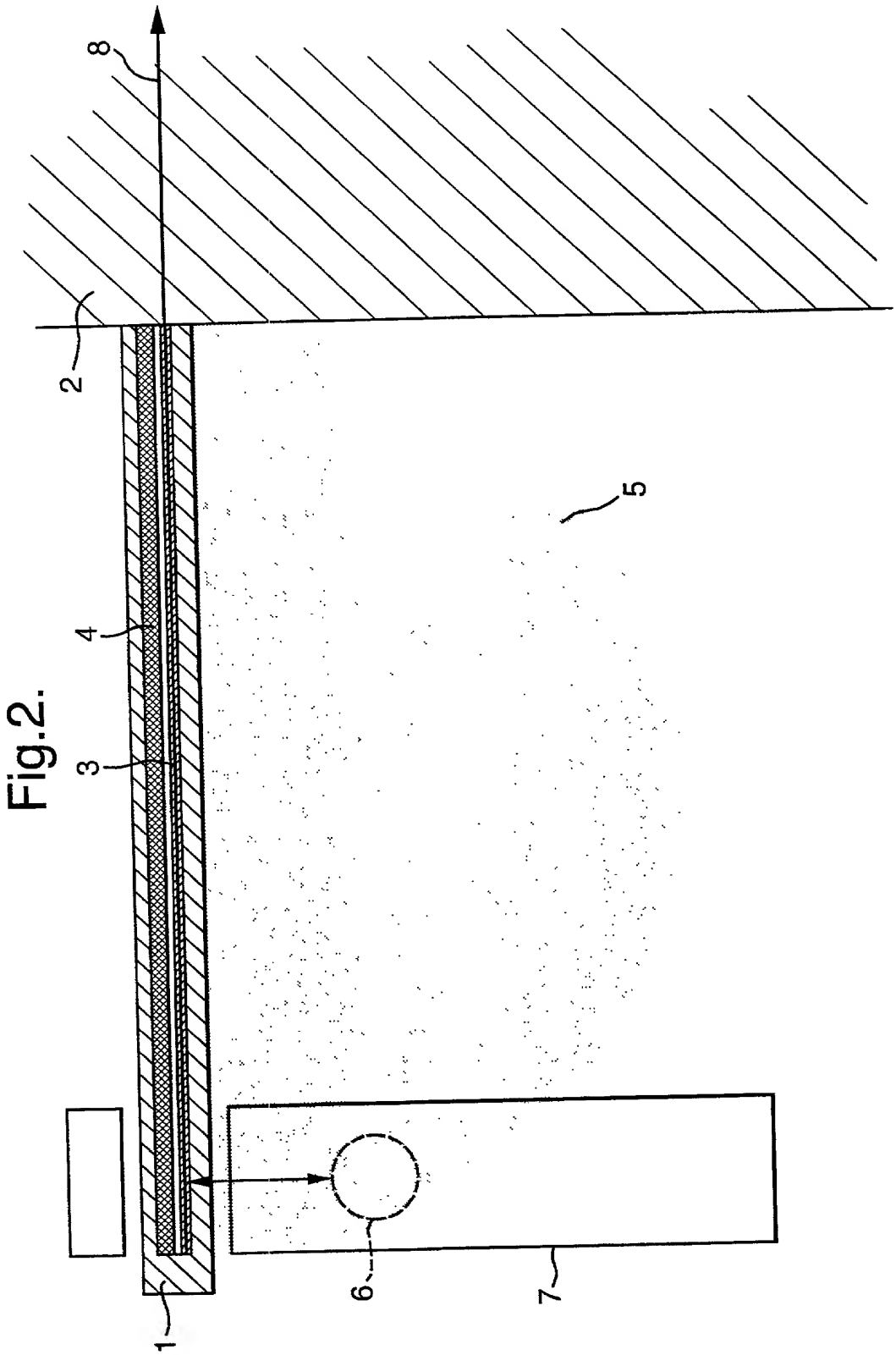


Fig.2.

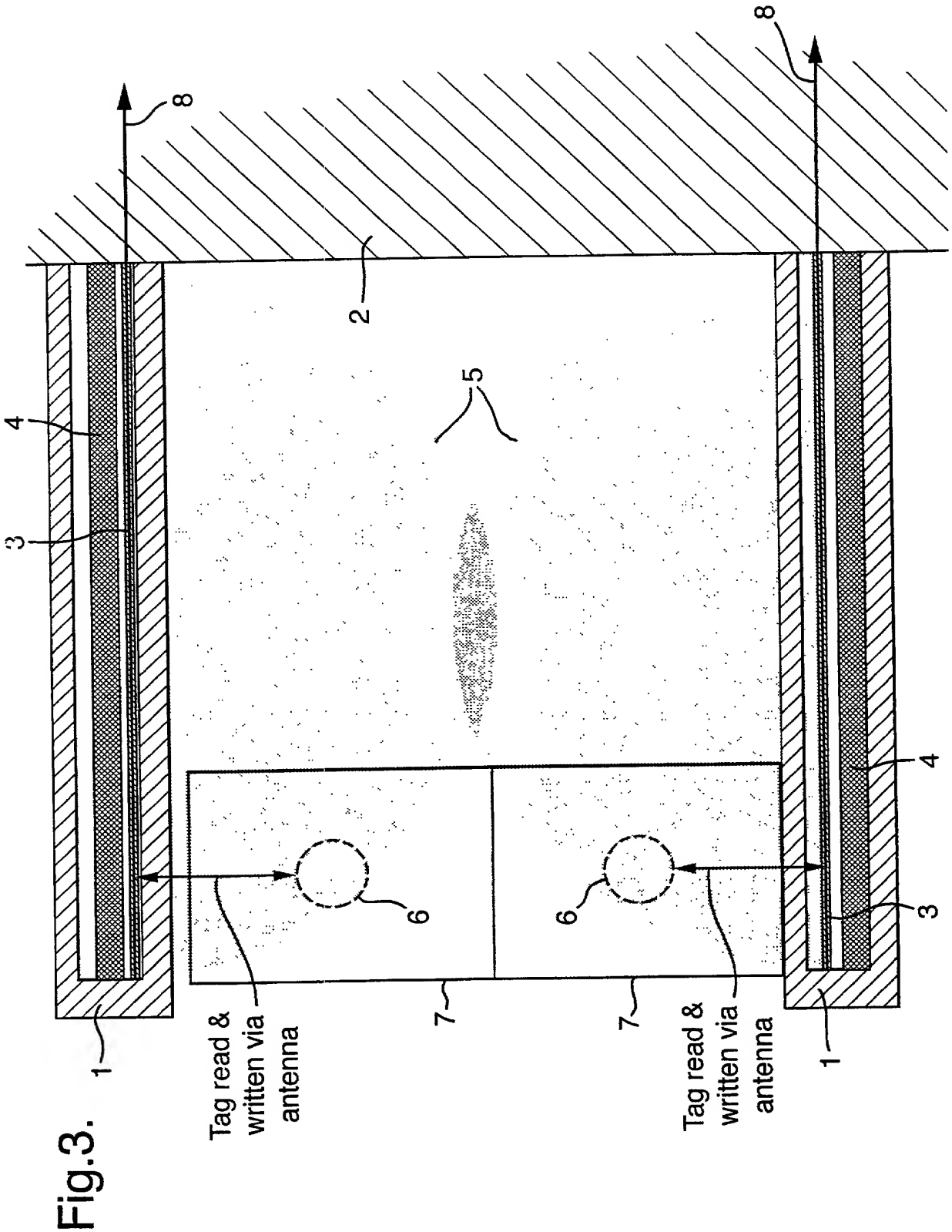

8
8
2
5
4
3
4
3
6
6
7
7
Tag read & written via antenna
Tag read & written via antenna
1
1

Fig.3.

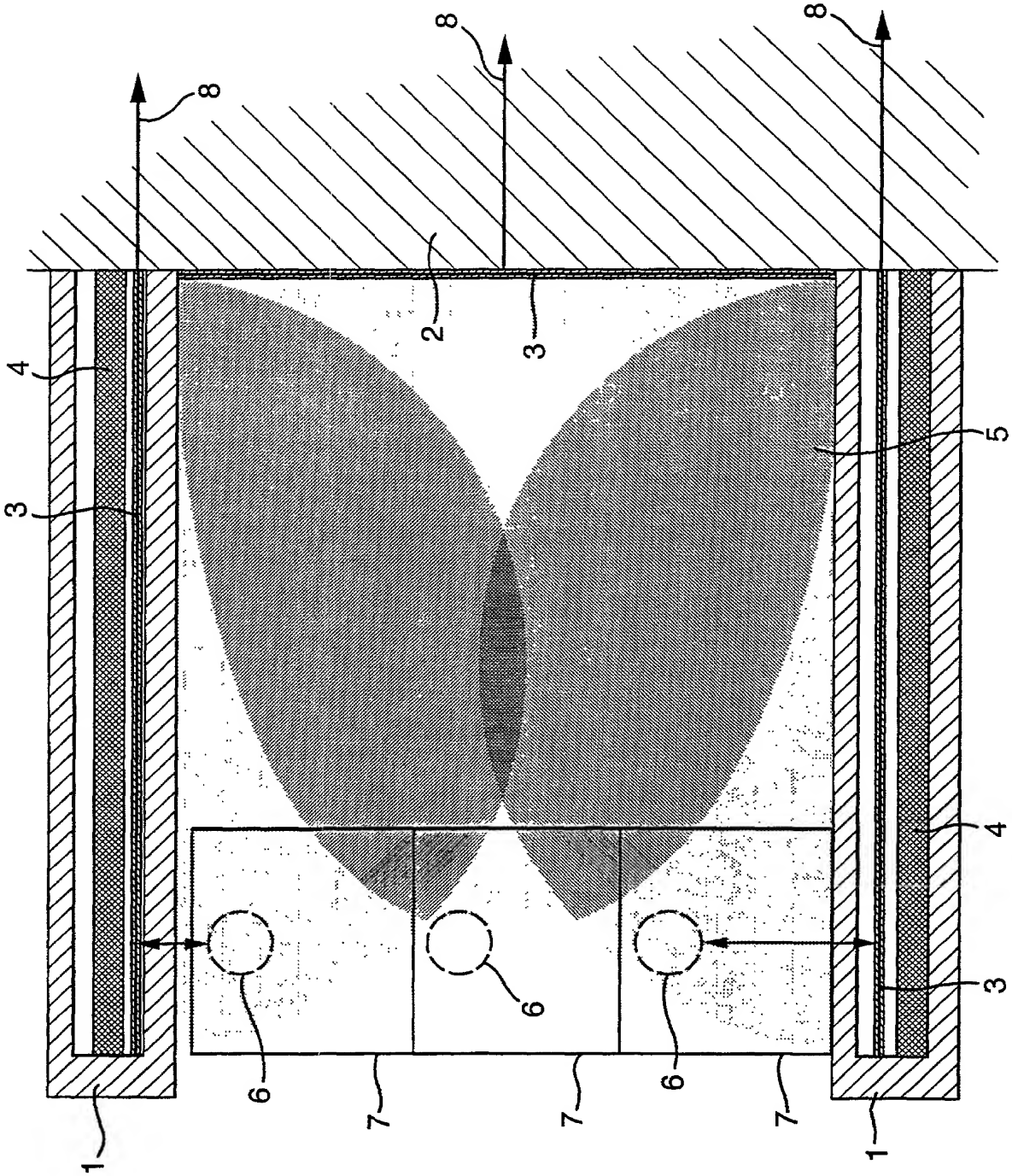


Fig.4.

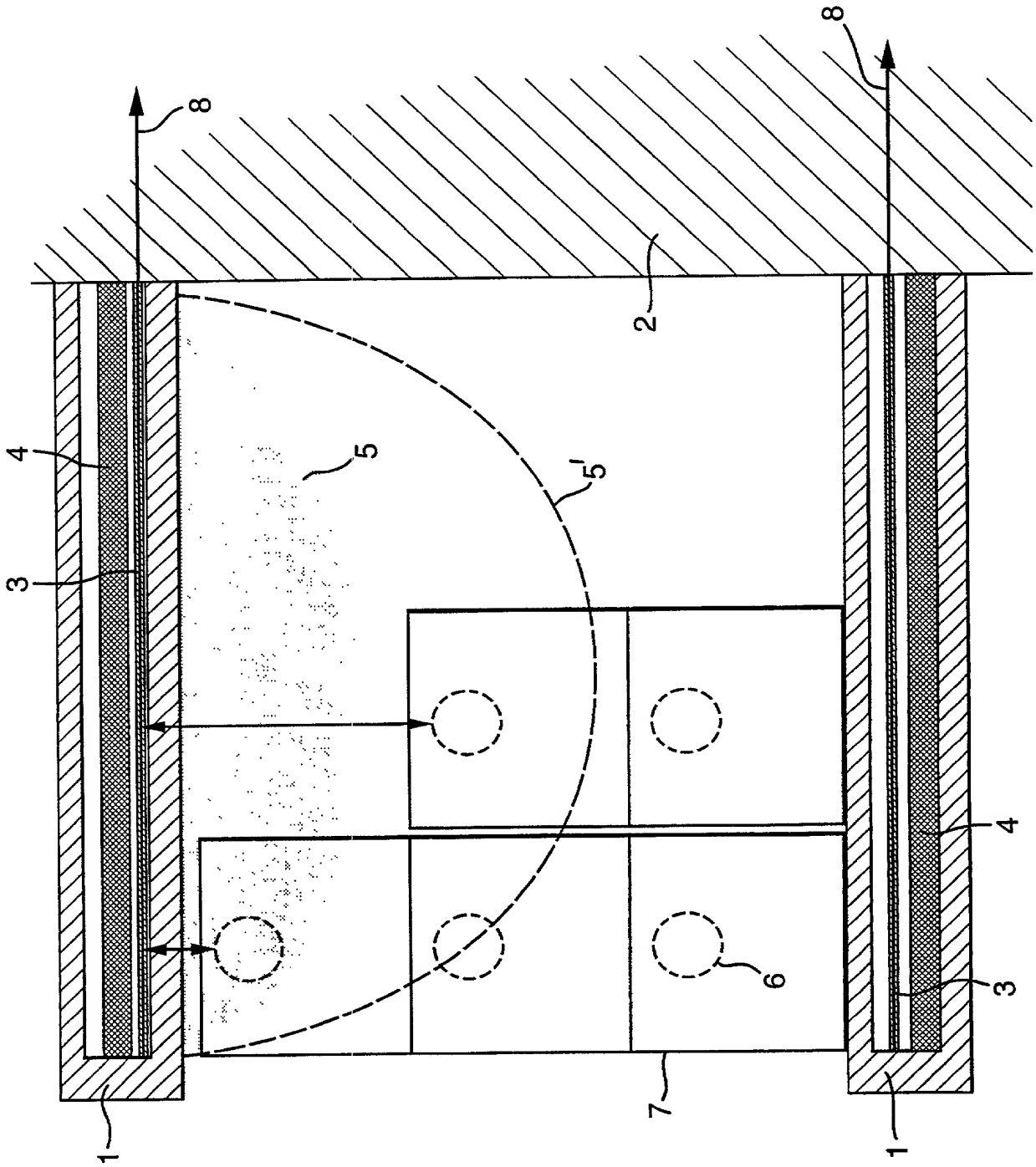


Fig.5.

DECLARATION COMBINED WITH POWER OF ATTORNEY

As a below named inventor, I hereby declare that:

My residence, post office and citizenship are as stated below next to my name.

I believe I am the original, first and sole inventor (if only one name is listed below) or an original, first and joint inventor (if plural names are listed below) of the subject matter which is claimed and for which a patent is sought on the invention entitled

"Storage System"

bearing the above listed Procter & Gamble Company Case number, the specification of which was filed as PCT/US00/11304, designating at least the United States of America, with the United States Receiving Office on 27 April 2000.

I hereby state that I have reviewed and understand the contents of the above identified specification, including the claims.

I acknowledge the duty to disclose information which is material to the patentability of this application in accordance with Title 37 Code of Federal Regulations §1.56.

I hereby claim foreign priority benefits under Title 35 United States Code §119 of any foreign application(s) for patent or inventor's certificate or of any PCT international application(s) designating at least one country other than the United States of America listed below and have also identified below any foreign application for patent or Inventor's certificate having a filing date before that of the application on which priority is claimed:

PRIOR FOREIGN APPLICATION(S) TO WHICH WE CLAIM PRIORITY:

99303314.1	**EP**	28 April 1999

I hereby claim the benefit under Title 35 United States Code §120 of any United States application(s) or PCT international application(s) designating the United States of America that is/are listed below and, insofar as the subject matter of each of the claims of this application is not disclosed in the prior United States application in the manner provided by the first paragraph of Title 35 United States Code §112, I acknowledge the duty to disclose material information as defined in Title 37 Code of Federal Regulations §1.56 which occurred between the filing date of the prior application and the national or PCT international filing date of this application:

(Appln. Serial No.)	(Filing Date)	(Status)(patented, pending, abandoned)
(Appln. Serial No.)	(Filing Date)	(Status)(patented, pending, abandoned)

I hereby appoint the following as my attorney(s) or agent(s) with full power of substitution to prosecute this application and transact all business in the Patent and Trademark office connected therewith:

Name	Registration No.	Associate Power of Attorney Attached [ ] Yes [ ] No
Jacobus C. Rasser	37,043	
Donald E. Hasse	29,387	
T. David Reed	32,931	
Eileen L. Hughett	34,352	
Timothy B. Guffey	41,048	
Emelyn L. Hiland	41,501	

6

SEND CORRESPONDENCE TO:

Name			Phone No.
T. David Reed, c/o The Procter Gamble Company			(513) 627-7025
Street	City	State	Zip Code
5299 Spring Grove Avenue	Cincinnati	Ohio	45217-1087

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

1-10

Full name of sole or first inventor: ASHTON, Kevin John
Inventor's signature Kevin Ashton J. Date June 23, 2000

Residence: 8 St. Giles Road London SE5 7RL GB GBN
Citizenship: GB
Post Office Address: Same as above

Full name of second joint inventor, if any:
Inventor's signature _____ Date _____

Residence:
Citizenship:
Post Office Address: _____

Full name of third joint inventor, if any:
Inventor's signature _____ Date _____

Residence:
Citizenship:
Post Office Address: _____

Full name of fourth joint inventor, if any:
Inventor's signature _____ Date _____

Residence:
Citizenship:
Post Office Address: _____